

The American School Foundation of Guadalajara
Honors Pre-Calculus
1st Quarter Project: Promoting creativity and team-building by building transforming
Transformer Halloween costumes
September-October 2010

“Imagination is more important than knowledge.” Albert Einstein

Introduction: One of the most valuable skills students can cultivate in mathematics, and in real life, is creativity. Solving problems that have never before been solved before produce an inner self-satisfaction that few people can assimilate. Andrew Wiles, who spent 8 years of his life proving *Fermat’s Last Theorem*, reflected on comparing future math problems to Fermat. This is what he said:

“I’m sure that some of them will be very hard and I’ll have a sense of achievement again, but nothing will mean the same to me - there’s no other problem in mathematics that could hold me the way that this one did.”

But creative genius is not only appreciated in academics. In business, exciting and unique products sell and the people who invent them become wealthy men and women. According to Apple co-founder and CEO Steve Jobs, *“Innovation distinguishes between a leader and a follower.”*

Objective: Construct a transforming Halloween costume of one of the Transformer robots for use in the ASFG Halloween parade. A secondary objective is to help your teacher live out his fantasy of becoming *Optimus Prime*.

Organization: This is a team project; the due date is one day before ASFG’s Annual Halloween Parade which will most likely to place on Friday, October 29. No class time will be devoted to working on this project, although your teacher will be available after school and on weekends for consultation. The project is classified “Top Secret – Eyes Only” so you cannot talk about what you are creating with friends or family. (OK, if your parents ask you why you need to use the garage for the next month, you can tell them.) I suggest we split the class into two teams of five students each: one team constructs an *Optimus Prime* costume for your pre-calculus teacher and the other team constructs a Transformer (Autobot or Decepticon) costume of their choice. Except for the team who is selected to build *Optimus Prime*, student teams are responsible for funding their own project. The maximum budget for *Optimus Prime* is 1,000 pesos; this will be paid by your teacher.

Here are the team assignments. Everyone has something to contribute to the project. Some of you are more interested in the construction aspects of the costume, others may be engrossed in the artistic details and still others enjoy video editing and production. We need everyone’s talents for an outstanding result.

Team A	Team B
Berny	Yong
Carlos	Alejandro
Maria Ines	Fernando
Pilar	Jandra
Sae	Estefania

Requirements:

The Halloween costume must depict a transformable Transformer robot that remains true to the comic book or movies. For example, if you make an *Optimus Prime* costume, *Prime* should transform to a blue and red Freightliner/Peterbilt semi tractor-trailer. If you make a *Bumblebee* costume, *Bumblebee* should transform to a yellow and black Chevrolet Camaro.

The costume should be relatively comfortable so that the wearer can walk around the track under his or her own power and vision, transforming three or four times along the way. Simply put, the goal of the costume is to absolutely “blow away” all Halloween attendees. Early Childhood students should be in awe. If a “For sale to highest bidder” sign were placed on the costume after the parade, it should sell for at least 1,000 pesos (or considerably more as droves of ASFG Warriors and their parents take the bidding war to outrageous price levels!).

Examples of homemade Transformer costumes that would have the desired impact are:

Character(s)	Link	Comments
Optimus Prime & Megatron	http://www.youtube.com/watch?v=5jlA54xzSgg	3 meters tall, non-transforming
Prime & Bumblebee	http://manga.about.com/od/conventionphotogallerie/ig/2009-Kawaii-Kon-Gallery/Kawaii-2009---Transformers.htm	Outstanding, professional, but non-transforming costumes, made from foam
Starscream	http://www.youtube.com/watch?v=A1oP8emGGol	Excellent
Optimus Prime	http://www.instructables.com/id/Building_Optimus_Prime/	Step-by-step guide on how to build a non-transforming Optimus prime costume
Various	http://www.youtube.com/watch?v=akNJ6S2UqsE	Very good homemade transforming costumes

Although the costume is the most tangible product of the project, other obligatory components are:

- A daily journal in a spiral notebook that clearly (but informally) articulates the details of the team’s ideas, designs, material queries, and construction progress
- An appropriately edited video illustrating the design and construction process.

Project Submission:

1. Due to the “Top Secret” nature of this project, the costume should not be brought to school on the due date specified. Instead, the team should make the costume available for their teacher’s inspection at a mutually convenient location.
2. The instructional video (.avi) should be turned in on a compact disk (CD). No email or flash memory submissions please. Both the CD and the CD case must bear the name and period of all team members. The team is responsible for ensuring that the files are not corrupted and can be opened by their teacher’s computer.
3. The original hard copy daily journal should be turned in with the CD with name and period of all team members on the front cover.

Project Grading:

Aspect	Total points possible
1. Daily journal (see rubric below)	12
2. Transforming costume (see rubric below)	28
3. Instructional video (see rubric below)	18
4. Collaboration* (see rubric below)	18
Total	76

N.B. Each team member receives the same score for aspects 1, 2 and 3.

* The “Collaboration” score is the mean score given an individual team member by his or her teammates.

Names: _____

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Honors Pre-calculus: 1st Quarter Project
Daily Journal Grading Rubric

Aspect	4	3	2	1	0	Your grade	Comments
Access & Status	Daily access to teacher is granted and journal is up-to-date. Represents a great deal of time spent.	Almost daily access is granted (“forgot”) and is nearly always up-to-date. Represents an appropriate amount of time spent.		Sketchy access granted to teacher and journal is not even close to being up-to-date. Represents and inappropriate amount of time spent.	Not done		
Diagrams	Hand-drawn diagrams, still photos and <i>SketchUp</i> models are used <u>superbly</u> to explain ideas and construction methods. Detailed labels are used exhaustively.	Hand-drawn diagrams, still photos and <i>SketchUp</i> models are used <u>adequately</u> to explain ideas and construction methods. Detailed labels are used appropriately.		Journal is primarily text-based with few visual aids and does not give the reader a sense of what is happening with the project.	Not done		
Completeness	All ideas are present and fully-developed. Detailed logical reasons are given as to why some ideas are kept and others discarded. Details of material acquisition are present. Represents a great deal of time spent documenting the project on a day-to-day basis.	Most ideas are present but are often undeveloped. Some discussion is included on why some ideas are kept and others discarded, but discussion lacks detail, logic or both. Some details are present concerning material acquisition, but they are incomplete. Represents an appropriate amount of time spent documenting the project on a day-to-day basis		Few ideas are present and fully-developed. No rhyme or reason is given why some ideas are kept and others discarded. Poor documentation of material acquisition. Represents an inappropriate amount of time spent documenting the project on a day-to-day basis.	Not done		
Total							

Names: _____

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Costume Grading Rubric

Aspect	4	3	2	1	0	Your grade	Comments
Costume Overall design	Very creative, well-integrated, represents a great deal of time spent	Average creativity, represents an appropriate amount of time spent	Lacks creativity, represents an insufficient amount of time spent	No integration, supremely poor effort, doesn't fit, embarrassing to wear	Not done		
Costume Comfort	Extremely comfortable, no obstruction of vision, includes comfort details (e.g. kneepads), wearer can walk around track without assistance	Comfort level or field of vision acceptable, wearer can walk one lap of track independently, but not much more	Uncomfortable or with major visual obstruction. Wearer needs help from a 3 rd party to make it one lap around the track.	A 50-year old man cannot make it around the track wearing the costume, with or without 3 rd party assistance	Not done		
Costume Originality	All or nearly all components homemade	Some components not homemade		Costume is based on commercially-available products	Not done		
Costume Details	Rich in details (e.g. realistic lights, windshield & wheels, paint, logos, voice modulator, weapons etc.)	Moderate amount of detail		A few unexciting details	Not done		
Costume Craftsmanship	Seams, logos, paint etc. are all of near-professional quality	Craftsmanship commensurate with 9 th grade honors student skill level		Shoddy workmanship, an embarrassment	Not done		
Costume Transforming Ease	Smooth, effortless and painless transformation for a 50-year old man	Some rough spots during transformation		Does not transform	Not done		
Costume Resilience	Costume can tolerate multiple wearings and a thunderstorm	Costume can tolerate either multiple wearings or a thunderstorm, but not both		Costume will fall apart after one wearing and cannot withstand a thunderstorm	Not done		
Total							

Instructional Video Expectations

Organization: One video per team.

Format: Any commonly available video format. Ask if you are not sure.

Language: English. Subtitles or voice-over narration may be used.

Length: Unless the costume is completely over-the-top, a well-edited 7 minute video should be completely adequate.

Title: Make it fun, but descriptive.

Approximate budget: Put in Mexican pesos and a U.S. dollar equivalent.

Time estimate: An estimate of the time necessary to build your project in man-hours.

References: If you based your design off another published plan, list it near the beginning of your video. If you used other reference material to solve problems in either the design or construction of your project, include the reference at the appropriate part of the video when the problem is confronted and solved.

Materials This should be a detailed list of the materials used to make your project. If a material is potentially difficult to find, it would be helpful to list a local supplier with address and telephone number.

Tools required: This should be a comprehensive list of all tools required to build your project.

Special skills: If any special skills (e.g. welding, soldering) are required, list them here.

Procedure: This is the most important part of your video. The information needs to be presented in clear and precise English with sufficient detail such that another ASFG high school student could re-create your project solely by viewing this video. Content should be taken from the Daily Journal. Grammar and spelling are important.

Final product demonstration: This section should clearly demonstrate and document the costume transforming between robot and alt modes. Other details that would be appropriate to document would include working lights, a voice synthesizer/amplifier, a well-done homemade helmet, etc.

Instructional Video Rubric

18 points	15 points	9 points	Zero points
Outstanding, with superb editing, perfect English, instruction of such high caliber that the project could be duplicated by another ASFG 9 th grade student solely by watching this video.	Very good; with good editing; good English but with a few grammatical and/or spelling mistakes; high level of instruction, but it is likely that another ASFG 9 th grade student attempting to duplicate the project would need additional guidance not available in the video.	Unsatisfactory; poor editing; poor to fair English; such a low level of instruction that another highly-motivated ASFG 9 th grade student attempting to duplicate the project would grow so confused and frustrated that they would never even start the project.	Not done

Collaboration Rubric

This rubric may be used for self-assessment and peer feedback.

CATEGORY	Exemplary	Proficient	Partially Proficient	Incomplete	POINTS
Focus on the Task and Participation	3 points <input type="checkbox"/> Consistently stays focused on the task and what needs to be done. Very self-directed.	2 points <input type="checkbox"/> Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	1 point <input type="checkbox"/> Focuses on the task and what needs to be done some of the time. Other group members must sometimes remind this person to keep on task.	0 points <input type="checkbox"/> Rarely focuses on the task and what needs to be done. Lets others do the work. .	
	<input type="checkbox"/> A true team member who contributes a lot of effort, and encourages and supports the efforts of others in the group.	<input type="checkbox"/> A strong group member who tries hard!	<input type="checkbox"/> Sometimes a satisfactory group member who does what is required	<input type="checkbox"/> Sometimes chooses not to participate and does not complete assigned tasks.	
Dependability and Shared Responsibility	3 points <input type="checkbox"/> Consistently punctual for group meetings, turns in all work on time.	2 points <input type="checkbox"/> Usually punctual for group meetings, turns in most work on time.	1 point <input type="checkbox"/> Sometimes late for group meetings, frequently turns in work after the deadline.	0 points <input type="checkbox"/> Late for all or most group meetings, misses all deadlines for turning in work.	
	<input type="checkbox"/> Follows through on assigned tasks and does not depend on others to do the work, responsibility for tasks is shared evenly.	<input type="checkbox"/> Follows through on most assigned tasks.	<input type="checkbox"/> Does not follow through on most assigned tasks and sometimes depends on others to do the work.	<input type="checkbox"/> Seldom or never follows through on assigned tasks. Depends on others to do all of the work.	

Listening, Questioning and Discussing	3 points <input type="checkbox"/> Respectfully listens, interacts, discusses and poses questions to all members of the team during discussions and helps direct the group in reaching consensus.	2 points <input type="checkbox"/> Respectfully listens, interacts, discusses and poses questions to others during discussions.	1 point <input type="checkbox"/> Has some difficulty respectfully listening and discussing, and tends to dominate discussions.	0 points <input type="checkbox"/> Has great difficulty listening, argues with teammates, and is unwilling to consider other opinions. Impedes group from reaching consensus.	
Research and Information-Sharing	3 points <input type="checkbox"/> Routinely gathers research and shares useful ideas when participating in the group discussion. Defends/ rethinks ideas relating to the group's project goals.	2 points <input type="checkbox"/> Usually provides useful research and ideas when participating in the group discussion.	1 point <input type="checkbox"/> Sometimes provides useful research and ideas when participating in the group discussion.	0 points <input type="checkbox"/> Rarely provides useful research or ideas when participating in the group discussion.	
Problem-Solving	3 points <input type="checkbox"/> Actively looks for and suggests solutions to problems.	2 points <input type="checkbox"/> Refines solutions suggested by others.	1 point <input type="checkbox"/> Does not suggest or refine solutions, but is willing to try out solutions suggested by others	0 points <input type="checkbox"/> Does not try to solve problems or help others solve problems.	
Group/Partner Teamwork	3 points <input type="checkbox"/> Consistently makes necessary compromises to accomplish a common goal.	2 points <input type="checkbox"/> Usually makes necessary compromises to accomplish a common goal.	1 point <input type="checkbox"/> Occasionally makes compromises to accomplish a common goal, and sometimes helps keep the	0 points <input type="checkbox"/> Rarely makes compromises to accomplish a common goal and has difficulty	

